sity of Ohio, and H. C. White, of the Georgia State College of Agriculture and Mechanic Arts.

Officers of sections: College Work, J. L. Snyder, of the Michigan Agricultural College, chairman; W. E. Stone, of Purdue University, Indiana, secretary; Agriculture and Chemistry, H. J. Waters, of the University of Missouri, chairman; C. G. Hopkins, of the University of Illinois, secretary; Horticulture and Botany, J. Craig, of the New York Cornell University, chairman; A. Nelson, of the University of Wyoming, secretary; Entomology, F. M. Webster, of the Ohio Experiment Station, chairman; H. E. Summers, of Iowa State College, secretary; Mechanic Arts, H. W. Tyler, of Massachusetts Institute of Technology, chairman; F. A. Anderson, of the Kentucky Agricultural and Mechanical College, Secretary.

A. C. TRUE.

MARCEL NENCKI.

BY the death, on October 14, of Professor Marcel Nencki, director of the Laboratory of Physiological Chemistry in the Institute of Experimental Medicine at St. Petersburg, physiological chemistry has lost one of its most active workers. Professor Nencki was born in Poland, January 15, 1847. After completing his medical studies at Berlin, he went to Berne in 1872, as assistant in the Pathological Institute of the Swiss University. At the same time he became Privatdocent in physiological chemistry; and his appointment to a chair in that subject, in 1877, was among the earliest recognitions which the science received as an independent field of study. In 1891 Professor Nencki went to St. Petersburg to take charge of one of the laboratories in the newly founded Institute, being succeeded at Berne by the late Professor Drechsel.

Of Professor Nencki's extensive contributions to organic chemistry, physiological chemistry and bacteriology, it will suffice here to recall his investigations on the chemistry of putrefaction and on the chemical processes which take place in the intestine; his studies on the behavior of aromatic bodies in the animal organism; his thorough researches on the pigments of the blood and on animal pigments in general; the investigation of the formation of ammonia and urea in mammals; and his last published paper (with N. Sieber) on the chemical composition of enzymes. In 1897, on the twenty-fifth anniversary of the beginning of his scientific activity, there appeared a volume entitled 'Sommaire des travaux accomplis par M. le professeur M. Nencki et ses élèves dans ses laboratoires à Berne et à St. Petersbourg.' 1869–1896. In recent years he has collaborated with Professor Andreasch in editing Maly's 'Jahresbericht über die Fortschritte der Thierchemie.' Although interrupted thus early, the work of a lifetime earnestly devoted to the pursuit of scientific truth has left many records of permanent value.

L. B. M.

SCIENTIFIC LITERATURE.

Studien über den Körperbau der Anneliden, V. By EDUARD MEYER. Translated from the original Russian. In Mittheilungen aus der Zoologischen Station zu Neapel, XIV., 3, 4, 1901. Pp. 338, 6 double plates.

Of the many attempts that have been made to explain the historical origin of the mesoblast and cœlome in higher animals, none is of greater interest than that of Professor Eduard Meyer, of the University of Kasan, whose views find their latest and fullest development in the present masterly paper, the product of many years of painstaking research by an uncommonly clear-sighted observer. All students of embryology are familiar with Hatschek's pregnant suggestion, made in 1877, that the mesoblastic pole-cells, characteristic of annelidan and molluscan development, were originally germ-cells, and that the cœlome of the annelids shows essentially the same relations as the gonad-cavities of the platodes. Accepting this sugges-

tion, R. S. Bergh, in 1885, maintained that the segmented cœlome of annelids is homologous with the cavities of the gonad-follicles of platodes and nemertines, and that the primitive function of the peritoneal epithelium of annelids was that of a germinal epithelium. The same conclusion was independently reached by Meyer and developed by him in 1890, as a sequel to his embryological studies on *Psygmobranchus*, into a general theory, of which the essential points are that the mesoblast-bands (developed from the pole-cells) of annelids are homologous, as a whole, with the paired gonads of the platodes; that by a change of function many of the primitive germ-cells gave rise to somatic mesoblastic elements; that by this process a 'secondary mesoblast' arose; and that lastly, by a partial process of substitution, the secondary mesoblast, in a greater or less degree, took the place of the primary mesoblast of the platode, which, however, still appears in the ontogeny as the 'larval mesenchyme' and some other structures. These last assumptions were not mere guesses, but were based on careful observations which showed that in at least one larval annelid (*Psygmobranchus*) there are two entirely distinct sources of mesoblast, namely, a 'primary mesenchyme' derived from the ectoblast, and a 'secondary mesoblast' derived from the pole-cells, and forming the 'mesoblast bands' in the ordinary sense. The former gives rise to the larval muscles, some of which are only temporary or provisional structures (including the protrochal ring-muscle), and to some of the adult muscles, including those of the gut, of the dissepiments, and the circular muscles of the body-wall. The latter gives rise to the peritoneal epithelium, the gonads, and the longitudinal muscles of the adult. These results were supported by the independent observations of Bergh and Vejdovsky, showing that in leeches and earthworms also the circular muscles are of wholly different origin from the longitudinal ones, the latter alone arising from the mesoblast pole-cells.

In the present paper Meyer reenforces his position by a great number of new observations on many different annelids, of which the most thoroughly studied were *Polygordius* and *Lopadorhynchus*. Although both these forms had already become classical objects through the earlier work of Hatschek, Fraipont, Kleinenberg and others, Meyer brings forward an almost bewildering profusion of new results for both, which sustain and extend his earlier conclusions on *Psygmobranchus*. In both forms primary and secondary mesoblasts are wholly distinct in origin and in fate; in both, the mesoblast bands (secondary mesoblast) give rise only to the peritoneal epithelium, the gonads and the definitive longitudinal muscles of the body-wall; in both there are several regions in which mesoblast (primary mesenchyme) is independently derived from the ectoblast. From the primary mesenchyme are derived not only the provisional larval musculature, but also an important part of the definitive musculature, namely, that of the gut, of the parapodia and cephalic appendages, of the dissepiments, and the circular and diagonal muscles (when present) of the body-wall. Meyer thus shows that although a part of the larval musculature (for instance, the prototrochal ring-muscle) is undoubtedly of a provisional character, yet a much larger part of it is retained in the adult than has hitherto been supposed. This part is assumed to have been derived from the platode parenchyma, which has, as it were, been carried over into the annelid organization. Among many interesting special points may be mentioned the discovery of a *paratrochal* ring-nerve; and the demonstration, both in *Polygordius* and in *Lopadorhynchus*, of numerous true neuro-muscular foundations—*i. e.*, areas in which nerve-cells and primary muscle-cells are proliferated from common ectoblast areas, but it is also shown with perfect clearness that Kleinenberg was in error in maintaining the origin of the secondary mesoblast-bands and the ventral nerve-cords from such a common neuro-muscular foundation. Interesting detailed studies are given of the larval nervous system; Kleinenberg is shown to have been in error in deriving the germ-cells directly from the ectoblast; and the existence of Hatschek's famous nephridial 'Längscanäle' is again denied.

Fortified by these new facts, Meyer reasserts and further extends his original hypothesis, giving a thorough and critical review of the

literature and putting forward many ingenious suggestions regarding the possible phylogeny of the cœlome, blood-vessels and musculature, the origin of metamerism, and other deep-lying morphological problems. Phylogenetic speculations on embryological data are getting out of fashion, and some of Meyer's conclusions will doubtless meet with little sympathy on the part of those whose interest in the historical problems of morphology has suffered a temporary attack of paralysis through devotion to more 'modern' questions. Even the sceptical reader, however, who will take the trouble to examine Meyer's work with care, will not be able to deny that the theoretical views are everywhere held closely in touch with admirably thorough and extended observation, and constitute no mere inflated speculative system, but a natural working hypothesis growing directly out of the facts.

In the present paper Meyer considers only the larval development; and his results form a most important supplement to that of students of cell-lineage, who have not, in general, carried their work to a sufficiently late period to determine the real relation of the germ-layers to the adult body. It may be pointed out, however, that the comparative study of cell-lineage in platodes, annelids and mollusks has steadily added weight to Meyer's original contention of a double origin of the 'mesoblast,' for it has shown that in the two higher groups a 'larval mesenchyme' is often formed from cells of the ectoblastic quartets, which are quite distinct from the pole-cells of the secondary mesoblast, the latter (with the apparent exception of *Capitella*) being always derived from a cell of the fourth quartet (otherwise entoblastic). The cell ancestry of the larval mesenchyme thus agrees in a general way, though with interesting modifications of detail, with that of the mesenchyme (mesoblast) of polyclades, which inevitably and independently suggests the same view as that of Meyer, though from a quite different point of view.* Meyer's observations render it in the highest degree probable that, as the writer has suggested, mesenchyme may arise from any of the three ectoblastic quartets; for (not to mention the so-called 'head-kidneys' of *Nereis*), such origin has already been observed in the second and third, and if the cell-lineage of *Polygordius* and *Lopadorhynchus* is of the same type as in other annelids, as can hardly be doubted, the umbrellar neuro-muscular foundations in these forms must be derivatives of the first quartet.

The gonad theory of the cœlome, which Meyer has done so much to advance, has made a deep impression on morphology, as may be seen, for instance, by reference to the admirable review of the theories of the cœlome by Ray Lankester in the second volume of his 'Treatise on Zoology,' which appeared last year; and it has made serious inroads on the widely accepted enterocœle theory. Whether the two views can be reconciled is not to be determined without further research; for some of the most important observations on which Rabl, Lankester and others have relied in attempting to trace the transition from the pole-cell type to the enterocœle type (*e. g.*, pole-cells in *Amphioxus*, gut-pouches in *Paludina*) have been shown to be erroneous. Meyer believes the enterocœle type to be secondary; Lankester accepts the reverse view. Others have suggested the possibility that the two types have been distinct from the beginning, and this has for years been held open in the writer's advanced lectures on zoology and embryology as a possible basis for a division of the 'triblastic' animals into two parallel but independent series that diverged further down than the platodes—a division which, though entirely provisional, and as yet without adequate basis, nevertheless brings into order a surprisingly large number of facts otherwise difficult to reconcile. This is a question for the future, and may be left with Lankester's significant remark, that "When the cell-lineage of mesenchyme and its tissue-products has been cleared up we may be able finally to put aside the hasty criticisms and phantastic assertions of those who have grown impatient over the slow and difficult task of cellular embryology." EDMUND B. WILSON.

* Cf. Wilson, 'Considerations on Cell-lineage and Ancestral Reminiscence,' in *Annals N. Y. Academy of Sciences*, XI., 1, 1898.

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The work before us is Part III., of the publi-